

### **REMARKS**

Favorable reconsideration and allowance of this application are requested.

At the outset, applicants undersigned attorney wishes to express his appreciation to Examiner Raymond for the time and courtesies during the personal interview of January 29, 2009. It is believed that the substance of the interview is adequately reflected on the Examiner Interview Summary Record and thus further comment on the same is not believed to be necessary.

No claim amendments have been proffered. Therefore claims 1, 3-8, 11-13, 16 and 18-48 remain pending in this application in a form as submitted with the applicants' prior amendment dated July 7, 2008.

#### **1. Response to 35 USC §103(a) Rejections**

Applicants note with appreciation the Examiner's withdrawal of all prior rejections of record. In this regard, the Examiner found the applicants' prior arguments to be persuasive and therefore withdrew all prior rejections based on Taketo.<sup>1</sup> However, the Examiner has now advanced a new set of rejections based principally on the combination of Garito (US 2003/0175004) in view of the previously cited Taketo publication (JP 10-340846).

Specifically, claims 1, 3-8, 13, 16, 43 and 46 have now attracted a rejection under 35 USC §103(a) based on Garito in view of Taketo, while claims 18-24, 27-29, 42, 44-45 and 47-48 attracted a rejection under this same statutory provision on the basis of Garito in view of Taketo and Gogel (USP 2004/0257544). Finally, Garito, Taketo and Pohl (USP 5,618,872) have been combined to rejection claims 11 and 12

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<sup>1</sup> "Applicant's arguments, filed 7/7/2008, have been fully considered and are persuasive. Therefore the rejection has been withdrawn." Official Action dated October 29, 2008 at paragraph 7.

under 35 USC §103(a), while Garito, Taketo, Vogel and Pohl were combined to rejection claims 25-26 and 40-41 under that same statutory provision.

In essence, it now appears that the Examiner's position is that, since Garito discloses adding nanoparticles to a "matrix material" so as to tune the index of refraction (RI) to between about 1 to about 5 (paragraphs [0104] and [0105]), then one would obviously (35 USC §103(a)) have added the nanoparticles of Garito to an immersion fluid since Taketo allegedly teaches the benefits of high RI in the context of immersion fluids.

Applicants suggest, however, that the Examiner's rational is flawed in several respects. For example, the Garito reference clearly is not within the scope and content of the prior art which a person of ordinary skill in the immersion lithography would consult. As such, it is not a part of the scope and content of the prior art for determining obviousness under 35 USC §103(a) based on the standards advanced by *Graham v. John Deere*.<sup>2</sup> That is, the Garito reference appears to be in an art that is non-analogous to that with which the present invention is concerned.<sup>3</sup> This initial conclusion is reached based on the fact that Garito is not from the same field of endeavor as that of the present invention (i.e., forming composite materials with reduced light scattering viz. a process for forming microchips by immersion lithography). Indeed, Garito cites a number of applications relating to optical transmission devices in which the composite materials may be used (paragraph [0158]-[0159]), none of which is in the same technological field as liquid immersion lithography. And, since Garito and the present invention are not within the same field of endeavor, the disclosures in Garito are still not reasonably pertinent to the particular problem solved by the present invention.

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<sup>2</sup> *Graham v. John Deere*, 383 US 1 (1966).

<sup>3</sup> *Wang Laboratories Inc. v. Toshiba Corp.*, 24 USPQ2d 1767, 1773 (Fed. Cir. 1993).

As to this latter point, applicants note that the "matrix material" of Garito is intended to be a polymeric matrix whose RI can be increased from 1 to 5 (paragraph [0105]) by the addition of the nanoparticles. Thus, providing a polymeric matrix with increased RI of 1 to 5 is not in any way pertinent to an immersion lithography **fluid** with an additive to controllably alter its RI by at least 1% greater than the **fluid** without the additive.

Garito of course is directed to composite materials for optical devices and specifically addresses the problem of optical scattering loss resulting from nanoporous structures (paragraph [0017]). This problem is addressed through the selection of a host matrix (paragraph [0052]). The addition of nanoparticles to the host matrix is explicitly acknowledged by Garito to be actually **detrimental to the optical loss** (paragraph [0068]). However, nanoparticles are particularly added to the host matrix to allow the composite to act as a gain medium for light amplification used in optical wires and lasers (paragraphs [0079] and [0094]-0105]). To be used for these specialist applications, the nanoparticles must have the ability to change the refractive index of the composite material (paragraph [0100]).

A significant technical distinction between Garito and the immersion fluids of the present invention is that Garito is directed towards controlling the refractive index (RI) of the composite materials so as to make an optical amplifier (paragraph [0098]) which is directed at optimizing the transfer of light across a **spectrum of wavelengths** through a medium without losses, such as through an optical fiber. To achieve this, the optical wavelength may be **broadened** and **shifted** (paragraph [0099]). In contrast, the increase in refractive index in the immersion fluids of the present invention is focused upon improving image resolution at a single 193nm wavelength.

Thus, an ordinarily skilled person would not in the first instance assume that the RI increase achieved in Garito to broaden and shift wavelengths would or could be employed in immersion fluids so as to improve image resolution at 193nm wavelength.

As a result, one of ordinary skill in this art would not “obviously” employ the nanoparticles of Garito in the immersion fluids of Taketo.

Moreover, the Examiner’s comments with respect to Taketo are erroneous. In this regard, the Examiner asserts that Taketo teaches “...the importance of a *high index of refraction for immersion fluids*.”<sup>4</sup> In fact, as noted in applicants’ previous response of July 7, 2008 (incorporated fully herein by reference), the increase in RI suggested by Taketo is ***necessarily quite small*** (i.e., on the order of about 0.1% or less). Thus, notwithstanding the fact that Garito is non-analogous prior art, an ordinarily skilled person would not be directed toward substantially increasing the RI of an ***immersion lithography fluid*** in view of Taketo’s teaching that the RI increase would necessarily have to remain quite small. The “high index of refraction” to which the Examiner refers must necessarily only on the order of about 0.1% or less – certainly not a “high” value in terms of that which is claimed by the present applicants.

Applicants also suggest that the Examiner is incorrect in her comment that Taketo teaches recycling of the immersion fluid. In this regard, the Examiner asserts:

“Applicant argues that Taketo does not teach the recycling of the immersion fluid during exposure. However, it is apparent from Figure 2 that the immersion fluid is taken from above the substrate and is recycled back through the introducing pipe and over the substrate again.” Official Action at page 7, lines 3-6.

However, as sated in the machine translation of Taketo (paragraph [0026], Figure 2):

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<sup>4</sup> Official Action at page 7, lines 1-2, emphasis added.

"Since the gas generated near each electrodes D1 and D2 does not pass ion exchange membrane I1 and I2, it can be collected through exhaust pipes H1 and H2 here. This collected gas is sent to Mixer K. In mixer K, the collected gas (an oxygen gas, a hydrogen gas, hydrogen chloride gas) is mixed, and the additive water solution of high concentration (Liquid/LQ) is generated from this."<sup>5</sup>

Therefore, while the gaseous output from the electrodes is reused, the immersion fluid per se is **not** cleaned and recycled. As indicated in paragraph [0031] (Figure 3) of Taketo, the immersion fluid is discharged from an exhaust pipe, with pure water and additive used to make up the immersion fluid. The reference to the use of pure water further highlights that unrecycled immersion fluid is used in the process. As further indicated in the applicants' previous assessment of Taketo (see the remarks of the Amendment dated July 7, 2008 incorporated by reference herein), due to the minute changes in refractive index which are required, cleaning and recycling of the fluid component would not be considered a viable option, as the recycled immersion fluid would have a varying refractive index which would intrinsically be unsuitable for the fine control of the refractive index of the immersion fluid on a dynamic basis, especially given the high level of precision required.

As a result of the above, the presently claimed invention cannot be rendered "obvious" under 35 USC §103(a) based on a combination of Garito and Taketo. Withdrawal of such rejection is therefore in order.

Vogel and Pohl fail to cure the deficiencies of Garito and Taketo as noted above. In this regard, even though Vogel may disclose immersion fluids for 193 nm imaging which are water and a cyclo-octane and Pohl discloses "filler" materials that may

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<sup>5</sup> This quotation has been restated somewhat so as to remove the vestiges of literal translation and to thereby present it in more idiomatically correct English.

comprise an  $Al_3^+$  compound, or a fused amorphous  $SiO_2$ ,  $MgO$ , nanodiamond, and/or  $MgAl_2O_4$ , the general art knowledge of such materials per se would not in any way suggest to an ordinarily skilled person to produce microchips by an immersion lithography method as claimed herein. Thus, withdrawal of Vogel and Pohl as references against the presently claimed invention is in order also.

All art-based rejections advanced in the Official Action of October 29, 2008 are inappropriate and therefore should be withdrawn. Such favorable action is solicited.

## **2. Fee Authorization**

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

Respectfully submitted,

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